

Claim 14. The method of claim 13, wherein the CMP slurry comprises cerium oxide.

Claim 15. The method of claim 13, wherein the slurry modifier is ethylene glycol.

Claim 16. A method of chemically-mechanically polishing a silicon dioxide layer having high structure areas and low structure areas overlying a semiconductor substrate comprising:

forming a slurry comprising cerium oxide and ethylene glycol; and

polishing the silicon dioxide layer such that the high structure areas are polished at a rate approximating a blanket polishing rate, and the low structure areas are polished at a substantially zero rate.--

REMARKS

This amendment responds to an Office Action dated March 27, 2000. Claims 1-9 are pending in the application. In the Office Action claims 1-3 and 5-6 were rejected to under 35 USC §102(a) as being anticipated by Grover et al. (U.S. Patent No. 5,759,917). Claims 4, and 7-9 were rejected under 35 USC §103 based on a combination of Grover et al. and Burke et al. (U.S. Patent No. 5,934,978). No claims are allowed.

In response to the rejection under §102(a), although Grover et al. discloses a modified slurry containing cerium oxide, it fails to disclose a modified slurry having an polishing rate approximating a blank polishing rate for high structure areas.

Applicant respectfully submits that Grover et al. fails to disclose a modified slurry having a polishing rate for low structure areas of approximately zero. Grover et al. is focused on inhibiting polishing of silicon nitride structures, which lie beneath the oxide layer. This concern would not be necessary if the low spots are essentially untouched. For illustration, Fig. 2 of the present application depicts the CMP characteristics of silicon dioxide using a conventional slurry. The low area rate 26 still polishes the low area even before reaching the point of convergence 28, at which the material is planar. After the point of convergence 28, the material is planar, but can continue to be polished to a desired level. The fact that the material is eventually planar does not require that the low spots are essentially untouched. Grover et al. does not disclose a modified slurry having a polishing rate for low structure areas of essentially zero.

Claims 1-3, and 5-6 refer to polishing low structure areas at a substantially zero rate. These claims also refer to polishing high structure areas at a rate approximating a blanket polishing rate. Since these limitations are not disclosed by Grover et al., claims 1-3, and 5-6 are patentable and should be allowed.

In response to the rejection under §103, applicant respectfully submits that although Burke et al. discloses the use of ethylene glycol and ceria (also known as cerium oxide), it fails to disclose a method of combining these materials to produce a slurry with the polishing properties disclosed in the present application, even if combined with the teachings in Grover et al.

Even combined these references fail to teach a method of CMP that polishes high structure areas at a rate approximating a blanket

polishing rate, while polishing low structure areas at a substantially zero rate. Applicant respectfully contends that there has been no prior art submitted which would tend to indicate that this result would be expected. Conventional, non-ceria based, slurries produce polishing rates for high structures that are greater than the blanket polishing rate, and polishing rates for low structures that are appreciably greater than zero. Ceria-based slurries are known to produce polishing rates that are lower than the blanket polishing rate. The cited references do not anticipate, or teach, either alone or in combination, that ceria-based slurries can be modified to produce a slurry that approximates the blanket polishing rate for high structure areas. Applicant respectfully contends that claims 4, and 7-9, are patentable over the cited art, and requests that they be allowed.

In order to further clarify the differences between applicant's invention and the prior art cited by the Examiner, claim 10 through 16 have been added. Applicant respectfully requests allowance of these additional claims.

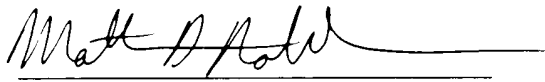
Accordingly, applicant respectfully submits that his claimed process is not taught or suggested in any reference cited by the Examiner, either alone or in combination.

The specification has been carefully checked and a correction made. It is clear from looking at Fig. 4 that the overall polishing rate associated with 42 is lower than the blanket polishing rate shown at 20, because the height as a function of polishing time is greater.

In view of the foregoing, the Applicant requests
reconsideration of the application and submits that the application is now
in allowable form and should be passed to issue.

Respectfully submitted,

Date: 7/26/2000


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